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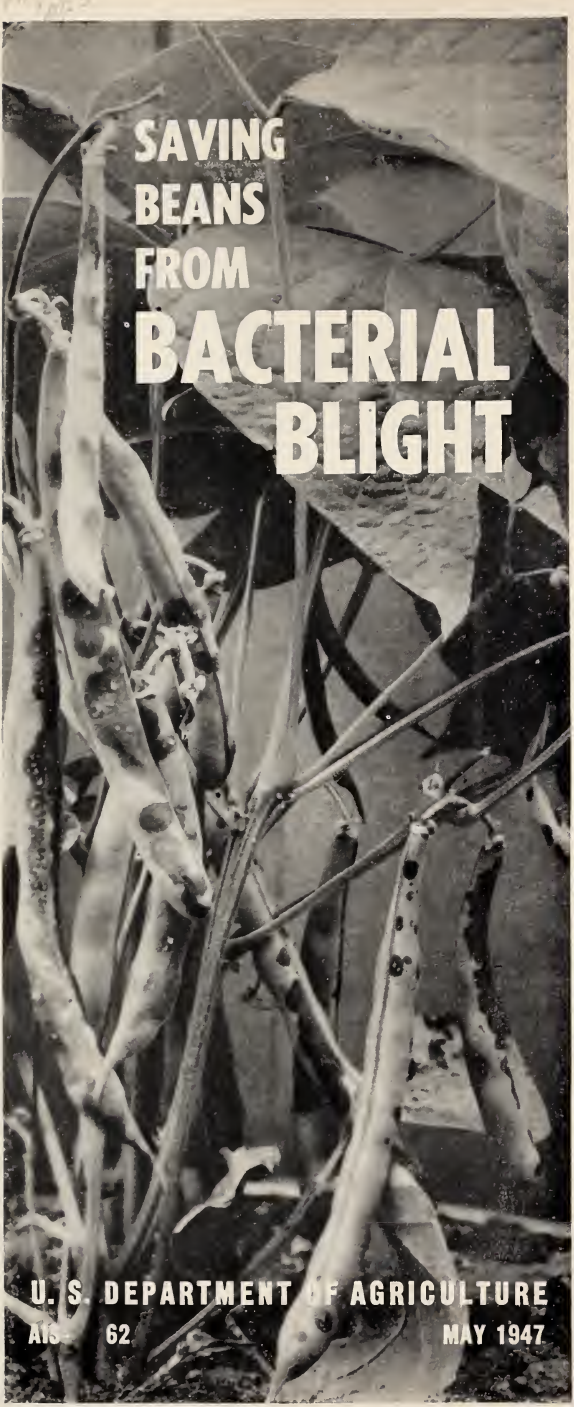

U. S. DEPARTMENT OF AGRICULTURE
AIS- 62 MAY 1947

What Is Bacterial Blight?

Bacterial blight is of major importance wherever beans are subject to frequent rains during the growing season. Only in certain sections in the Intermountain, Southwestern, and Pacific Coast States can this crop be grown relatively free of bacterial blight. The severity of blight in any one place varies greatly from year to year. It depends upon weather conditions and the presence of infected seeds in the seed lot. Crops are often so badly blighted that they are plowed up before harvest. Reductions in yield may range from a trace to as high as 75 percent. Blighted pods in shipments of beans for market and canning lower their value. In some years estimated losses from bean blight have run as high as $5,000,000 in the United States.

What Causes Bacterial Blight?

In the United States any one of three different important diseases may be called bacterial blight. These are common blight, halo blight, and wilt. These three diseases may occur in the same locality. They all have certain similar symptoms, but each is caused by a different bacterial organism. The causal bacteria may infect the stem, leaves, pods, and seed. Eventually they kill the infected plant. The bacteria are spread by wind, rain, hail, and other means from one plant to another. If conditions are favorable they cause new infections.

How Can Bacterial Blight Be Recognized?

Usually small, water-soaked spots on the leaves are the first visible evidence of blight. These enlarge, turn brown, and finally kill the leaf. Similar water-soaked spots occur on the pod. Commonly the bacteria invade the pod and infect the seed. On white seed a yellowish spot

may be visible at the point of attachment to the pod, whereas on colored seed the lesion is hard to detect.

When the plant is infected internally the bacteria spread rapidly throughout the plant. General stunting and gradual death of the plant result. Lesions, or diseased spots, known as stem girdle, or joint rot, occur at the node where the cotyledons were attached. The girdling is usually completed when the pods are half mature: then the affected stem, further strained by the increasing weight of the top, breaks at the node.

Besides these general symptoms, the different organisms that cause bacterial blight produce other symptoms by which the cause of the blight can be determined in the field. Under cool conditions the halo blight organism produces a halo-like zone of greenish-yellow tissue outside the water-soaked area; this halo is unlike the symptoms of the other diseases. Leaves of plants in a beanfield recently infected with the halo blight organism have a characteristic yellow color. In contrast, leaves of plants infected with the common blight organism turn brown rather rapidly; they look as if they had been burned.

The exudate, or ooze, of the common blight bacteria frequently found on pods is yellow, in contrast with the light-cream or silver color of that of halo blight bacteria.

Bacterial wilt does not commonly produce an exudate, because of the absence of water-soaked spots on the stems, leaves, and pods. Pod infection is often evident only after the pod is opened. As a result bacterial wilt spreads less rapidly than common or halo blights do.

How Does Bacterial Blight Get Started?

Plants grown from infected seed usually develop lesions on the cotyledons. From these

spots bacteria are splashed by rain to leaves of the infected plants or to others. A few diseased plants scattered throughout a field may cause a general outbreak when weather conditions are favorable for the spread of the bacteria.

The bacterial blight organisms remain in the soil on infected bean vines. These may infect a crop planted the following year. How much longer such bacteria may remain in the soil and infect subsequent bean crops is not definitely known.

What Weather Conditions Favor Bacterial Blight?

Bacterial blight is spread most rapidly during heavy rains and hailstorms. Unless such conditions occur no general outbreak takes place, even though a few infected plants are present in the field.

Halo blight is favored by cool weather and common blight by warm weather.

How Can Bacterial Blight Be Controlled?

The most effective control measures against bacterial blight are use of disease-free seed, rotation, and good cultural practices.

(1) ***Use of disease-free seed.***—Seed grown in areas receiving little or no rain during the growing season, such as certain sections of the Pacific Coast and Intermountain States, is free or relatively free of infection. Buy seed from a reputable source. Disease-free seed usually commands a premium price, but it is worth the cost.

(2) ***Rotation.***—Beans should not be planted in an infested field for at least 2 years, preferably longer.

(3) ***Staying out of the field when the plants are wet.***—Bacteria adhere to clothing and

machinery. Therefore such operations as picking and cultivating when the plants are wet can rapidly spread the bacteria from a few infected plants to the rest of the plants in the field.

Less effective control measures are the use of disease-resistant varieties, treatment of seed, and spraying and dusting.

(4) ***Use of disease-resistant varieties.***—No commercially grown varieties of garden or field beans possess a high degree of resistance to common blight. Field beans, such as Pinto, Great Northern, and Red Mexican, pea bean varieties, and many varieties of the semipole and pole types of garden beans are fairly tolerant to halo blight. Very little is known about the resistance of field and garden beans to bacterial wilt.

(5) ***Seed treatment.***—Seed treatment is of doubtful value because the bacteria are located beneath the seed coat. Merely reducing the percentage of infected seed is not satisfactory. The few remaining diseased seed can lead to an epidemic before the season is over if weather conditions are favorable for blight. Prolonged treatment by a disinfectant may lower germination.

(6) ***Spraying and dusting.***—The results obtained from spraying and dusting have been inconclusive.

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